Model Curriculum

QP Name: Servicing of Domestic Electronics Products, V2

QP Code: STC- ELE/2022 /1009, V2

QP Version: 2.0

NSQF Level: 3

Model Curriculum Version: 2.0

West Bengal State Council of Technical & Vocational Education and Skill Development, Karigari Bhavan, (5th Floor), Plot-B/7, Action Area-III, New Town, Kolkata-700160

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Training Parameters

Sector	Electronics & Hardware
Sub-Sector	Equipment Service & Spares
Occupation	Servicing of Domestic Electronics Products
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	
Minimum Educational Qualification and Experience	1. Class 10 Pass OR 2. Class 9 pass and pursuing continuous regular schooling, OR 3. Class 8 Pass with 2 year experience, OR 4. Class 8 Pass NTC/NAC (2 yrs) in Electronics Mechanic Trade
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	
Next Review Date	
Version	2.0
NSQC Approval Date	
Model Curriculum Creation Date	
Model Curriculum Valid Up to Date	
Model Curriculum Version	2.0
Minimum Duration of the Course	390 hours
Maximum Duration of the Course	390 hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the participants will be able to:

- Apply Safe Working Practices
- Select and perform electrical/ electronic measurement of single range meters and record the data.
- Test & service different batteries used in electronic applications and record the data to estimate repair cost.
- Plan and execute soldering & de-soldering of various electrical components used in domestic appliances and assemble and test a AM/FM receiver and evaluate performance.
- Install, configure, interconnect given computer system(s) and demonstrate its I/O devices.
- Identify, operate various controls, troubleshoot and replace modules of the LCD/LED TV and its remote.
- Install a DTH system by proper selection of site, assembling of different parts/ accessories and troubleshoot the system.
- Dismantle, identify the parts of microwave oven and washing machine for the testing and repair.
- Install a CCTV system and configure the system for surveillance function
- OJT.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
ELE/1009/OC1 Apply Safe Working Practices NOS Version No.: 2.0 NSQF Level: 3	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module1: Apply Safe Working Practices	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
ELE/1009/OC2 Select and perform electrical/ electronic measurement of single range meters and record the data. NOS Version No. :2.0	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**

NSQF Level:3					
Module2: Select and perform electrical/ electronic measurement of single range meters and record the data.	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
ELE/1009/OC3 Test & service different batteries used in electronic applications and record the data to estimate repair cost. NOS Version No.:2.0 NSQF Level: 3	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module3: Test & service different batteries used in electronic applications and record the data to estimate repair cost.	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
ELE/1009/OC4 Plan and execute soldering & de-soldering of various electrical components used in domestic appliances and Assemble and test a AM/FM receiver and evaluate performance. NOS Version No.:2.0 NSQF Level:3	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module 4: Plan and execute soldering & de-soldering of various electrical components used in domestic appliances and assemble and test a AM/FM receiver and evaluate performance.	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
ELE/1009/OC5 Install, configure, interconnect given computer system(s) and demonstrate its I/O	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**

devices. **NOS Version No.: 2.0** **NSQF Level: 3**					
Module 5: Install, configure, interconnect given computer system(s) and demonstrate its I/O devices.	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
ELE/1009/OC6 **Identify, operate various controls, troubleshoot and replace modules of the LCD/LED TV and its remote.** **NOS Version No.:2.0** **NSQF Level: 3**	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module 6:Identify, operate various controls, troubleshoot and replace modules of the LCD/LED TV and its remote.	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
ELE/1009/OC7 **Install a DTH system by proper selection of site, assembling of different parts/ accessories and troubleshoot the system.** **NOS Version No.: 2.0** **NSQF Level: 3**	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module 7: Install a DTH system by proper selection of site, assembling of different parts/ accessories and troubleshoot the system.	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
ELE/1009/OC8 **Dismantle, identify the parts of microwave oven and washing machine for the testing and repair.** **NOS Version No.: 2.0** **NSQF Level: 3**	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**

Module 8: Dismantle, identify the parts of microwave oven and washing machine for the testing and repair.	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
ELE/1009/OC9 **Install a CCTV system and configure the system for surveillance function** **NOS Version No.: 2.0** **NSQF Level: 3**	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module 9: Install a CCTV system and configure the system for surveillance function	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
ELE/1009/OC10 **OJT** **NOS Version No.: 2.0** **NSQF Level: 3**	**00:00 Hours**	**00:00 Hours**	**60:00Hours**	**00:00Hours**	**60:00 Hours**
Module 10: OJT	00:00 Hours	00:00 Hours	60:00Hours	00:00Hours	60:00 Hours
DGT/VSQ/N0102 **Employability Skills** **NOS Version No.: 1.0** **NSQF Level: 3**	**60:00 Hours**		**00:00Hours**	**00:00Hours**	**60:00 Hours**
Module 11: Employability Skills	60:00 Hours		00:00Hours	00:00Hours	60:00 Hours
Total Duration	**150:00 Hours**	**180:00 Hours**	**60:00Hours**	**00:00Hours**	**390:00 Hours**

Module Details

Module1: Apply Safe Working Practices

Mapped to ELE/1009/OC1

Terminal Outcomes:

- Maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements according to site policy.
- Recognize any unsafe situations according to site policy, and assess his report accordingly.
- Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
- Demonstrate Personal Productive Equipment (PPE) like: safety helmet, safety glove, safety shoe use the same as per related working environment.
- Demonstrate basic first aid & CPR and use them under different circumstances.

Duration: *10:00*	**Duration**: *20:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements according to site policy. • Recognize any unsafe situations according to site policy, and assess his report accordingly. • Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.	• Recognize any unsafe situations according to site policy, and assess his report accordingly. • Demonstrate Personal Productive Equipment (PPE) like: safety helmet, safety glove, safety shoe, use the same as per related working environment. • Demonstrate basic first aid & CPR and use them under different circumstances. • Identify different fire extinguishers and use the same as per requirement in a mock drill.
Classroom Aids: Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements: First Aid box, Different types of fire extinguishers, PPE kits, Safety charts.	

Module2: Select and perform electrical/ electronic measurement of single range meters and record the data.

Mapped to ELE/1009/OC2

Terminal Outcomes:

- Plan work in compliance with standard safety norms.
- Identify the type of electronic instruments.
- Determine the measurement errors while measuring resistance.
- Extend the range of MC voltmeter and ammeter.
- Measure the value of resistance, voltage and current using digital multimeter

Duration: *10:00*	**Duration: *20:00***
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
The students will be able to describe the followings:- ● Introduction to electrical and electronic measuring instruments. ● Basic principle and parts of simple meters. Importance and classification of meters. MC and MI meters. ● Range extension, need of calibration. Characteristics of meters and errors in meters. Multi meter, use of meters in different circuits. ● Care and maintenance of meters. Use of CRO.	The students will be able to demonstrate the followings:- ● Demonstrate various analog measuring instruments. Find the minimum and maximum measurable range of the meter. ● Carryout mechanical zero setting of a meter.AC & DC measurements . Use the multi-meter to measure the various functions (AC V, DC V, DC I, AC I, R). ● Identify the different types of meter for measuring AC & DC parameters . Identify the different controls on the CRO front panel and observe the function of each control. ● Measure DC voltage, AC voltage, time period using CRO sine wave parameters.

Classroom Aids:

Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook

Tools, Equipment and Other Requirements

Connecting screwdriver 100 mm, Neon tester , Screwdriver set(set of 7), Insulation combination pliers 150mm, Insulated side cutting pliers150 mm, Soldering iron 25 w,Tweezers 150 mm
De- soldering pump electrical heated, manual operators 230V, 40 w.
Analog and Digital Multimeter (41/2 digit), LCR Meter. 30 MHz Dual Trace CRO.

Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s

Different Electronic components - Resistor, Capacitor, Inductor, Transformer (CT & Bridge type), Diode, Transistor (NPN & PNP), MOSFET, FET, UJT, Analog ICs (741,555, 78XX series, etc.), Digital ICs (7404, 7402, 7486,7400, 7432, 4001,4011, 4070,4071 etc).

Module 3: Test & service different batteries used in electronic applications and record the data to estimate repair cost.

Mapped to ELE/1009/OC3

Terminal Outcomes:

- Identify tools and instruments for testing of batteries.
- Observe safety procedure during testing of batteries.
- Identify the primary and secondary cells.
- Measure and test the voltages of the given cells/battery using analog/ digital multimeter.
- Demonstrate Charging and discharging the battery.
- Maintain and estimate the repair cost of secondary battery.
- Use a hydrometer to measure the specific gravity of the secondary battery.

Duration:05:00	Duration:25:00
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
The students will be able to describe the following: ● Cells & Batteries Construction, types of primary and secondary cells. ● Materials used, specification of cells and batteries. ● Charging process, efficiency, life of cell/battery.	The student will be able to do the following: ● Identify the +ve and -ve terminals of the battery. ● Identify the rated output voltage and Ah capacity of given battery. ● Measure the voltages of the given cells/battery using analog/ digital multimeter. ● Measure the specific gravity of the electrolyte using hydrometer. Test a battery and verify whether the battery is ready for use of needs recharging
Classroom Aids:	
Computer,Projection Equipment, Power Point Presentation and software,Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Connecting screwdriver 100 mm, Neon tester , Screwdriver set(set of 7), Insulation combination pliers 150mm, Insulated side cutting pliers150 mm, Soldering iron 25 w,Tweezers 150 mm De- soldering pump electrical heated, manual operators 230V, 40 w. Analog and Digital Multimeter (41/2 digit), LCR Meter. 30 MHz Dual Trace CRO. Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s. Soldering/de-soldering station, AM and FM radio trainer kit. Battery Charger 0 - 6 - 9 - 12 - 24 , 15 Amps. UPS. Different types of Cells and Lead acid battery of 12V.	

Module 4: Plan and execute soldering & de-soldering of various electrical components used in domestic appliances and assemble and test a AM/FM receiver and evaluate performance.

Mapped to ELE/1009/OC4

Terminal Outcomes:

- Plan work in compliance with standard safety norms.
- Identify the primary and secondary transformer winding's and test the polarity.
- Measure the primary and secondary voltage of different transformers.
- Solder the given components Identify and test.
- Practice soldering and desoldering for a given components and circuits.
- Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal
- Plan and select tools to assemble the receiver.
- Test the various components of AM and FM on the trainer kit.
- Troubleshoot and replace the faulty components.
- Check the functionality of AM/ FM receiver.

Duration: *05:00*	**Duration: *25:00***
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
The student will describe the methods of ● Soldering process. Solder materials and their grading. Use of flux and other materials. Soldering and de-soldering stations and their specifications. ● Introduction to AM, FM transistor. ● Its various components and working viz. RF amplifier, Mixer, IF amplifier, AF amplifier and speaker.	The students will demonstrate the method of ● Soldering/ De-soldering procedure. ● Identify the primary and secondary transformer winding's and test the polarity. ● Practice soldering on different electronic components, small transformer and lugs. ● Practice soldering on IC bases and PCBs. ● Practice de-soldering using pump for de-soldering. ● AM and FM Radio Wave Propagation – principle, fading. Construct and test AM transmitter and receivers. ● Dismantle the given FM receiver set and identify different stages. Identify the components microphone, audio pre-amplifier, modulator, oscillator, RF-amplifier, and antenna.
Classroom Aids:	
Computer,Projection Equipment,Power Point Presentation and software,Facilitator's Guide, Participant's Handbook,	

Tools, Equipment and Other Requirements
Connecting screwdriver 100 mm, Neon tester , Screwdriver set(set of 7), Insulation combination pliers 150mm, Insulated side cutting pliers150 mm, Soldering iron 25 w,Tweezers 150 mm.De- soldering pump electrical heated, manual operators 230V, 40 w. Analog and Digital Multimeter (41/2 digit), LCR Meter. 30 MHz Dual Trace CRO. Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s Battery Charger 0 - 6 - 9 - 12 - 24, 15 Amps, Soldering/de-soldering station, AM and FM radio trainer kit.LCD/LED trainer kit (21-inch full HD LCD/LED Color Television should support PAL/ NTSC video formats Complete block diagram of a LCD/LED TV system, Study board indicating various sections of TV along with the test points and switch faults. Different Electronic components - Resistor, Capacitor, Inductor, Transformer (CT & Bridge type), Diode, Transistor (NPN & PNP), MOSFET, FET, UJT, Analog ICs (741,555, 78XX series, etc.), Digital ICs (7404, 7402, 7486,7400, 7432, 4001,4011, 4070,4071 etc). CCTV Set up DVR with amplifier, Connecting screwdriver 100 mm, Neon tester , Screwdriver set(set of 7), Insulation combination pliers 150mm, Insulated side cutting pliers150 mm, Soldering iron 25 w,Tweezers 150 mm, De- soldering pump electrical heated, manual operators 230V, 40 w. Analog and Digital Multimeter (41/2 digit), LCR Meter. 30 MHz Dual Trace CRO. Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s Battery Charger 0 - 6 - 9 - 12 - 24, 15 Amps, Soldering/de-soldering station, AM and FM radio trainer kit.

Module 5: Install, configure, interconnect given computer system(s) and demonstrate its I/O devices.

Mapped to ELE/1009/OC5

Terminal Outcomes:

- Plan, work in compliance with standard safety norms.
- Select hardware and software component.
- Install and configure operating systems and applications

Duration: *20:00*	**Duration: *40:00***
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
The student will be able to describe the following:- ● Introduction to computer, Components of desktop and laptop computer. ● Hardware and software, I/O devices, and their working. Different types of printers. Windows and operating systems. ● Procedure of installation of software in a computer.	The students will be able to do the following activities: ● Demonstrate various parts of the computer system and motherboard components. ● Identify various computer peripherals and connect it to the system. ● Boot the system from different options. Install OS in a desktop computer. ● Install a Printer driver software and test for print outs. ● Install antivirus software, scan the system and explore the options in the antivirus software.
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Connecting screwdriver 100 mm, Neon tester , Screwdriver set(set of 7), Insulation combination pliers 150mm, Insulated side cutting pliers150 mm, Soldering iron 25 w,Tweezers 150 mm De- soldering pump electrical heated, manual operators 230V, 40 w. Analog and Digital Multimeter (41/2 digit), LCR Meter. 30 MHz Dual Trace CRO. Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s Battery Charger 0 - 6 - 9 - 12 - 24, 15 Amps, Soldering/de-soldering station, AM and FM radio trainer kit. Desktop computer latest configuration, Computer Mother Board trainer kit. Laser jet printer Different Electronic components - Resistor, Capacitor, Inductor, Transformer (CT & Bridge type), Diode, Transistor (NPN & PNP), MOSFET, FET, UJT, Analog ICs (741,555, 78XX series, etc.), Digital ICs (7404, 7402, 7486,7400, 7432, 4001,4011, 4070,4071 etc). CCTV Set up DVR with amplifier	

Module 6: Identify, operate various controls, troubleshoot and replace modules of the LCD/LED TV and its remote.

Mapped to ELE/1009/OC6

Terminal Outcomes:

- Ascertain and select tools and materials for the job and make this available for use in a timely manner.
- Identify the different modules of TV and their functions.
- Trace and rectify the faults of a various remote controls.
- Measured and checked various connectors and connect the cable operator's external decoder (set top box) to the TV.
- Troubleshoot and rectify the fault by replacing the module and test for its functionality.

Duration: *10:00*	**Duration**: *50:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
The student will be able to describe the following:- ● Difference between a conventional CTV with LCD & LED TVs. Principle of LCD and LED TV and function viz. screen, chassis, motherboard, power board, remote receiving board, keypad, horn, remote control, all connection lines. ● Working principle, operation of remote control. Different adjustments, general faults in remote control.	The student will be able to describe the following:- ● Identify and operate different Controls on LCD, LED TV . Identify components and different sections of LCD and LED TV. ● Dismantle identify the parts of the remote control Dismantle the given LCD/LED TV to find faults with input stages through connectors. ● Detect the defect in a LED/LCD TV receiver given to you. Rectify the fault. Troubleshoot the faults in the given LED/LCD TV receiver. ● Locate and rectify the faults. Test LED/LCD TV after troubleshooting the defects.
Classroom Aids:	
Computer,Projection Equipment,Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements Connecting screwdriver 100 mm, Neon tester , Screwdriver set(set of 7), Insulation combination pliers 150mm, Insulated side cutting pliers150 mm, Soldering iron 25 w,Tweezers 150 mm.De- soldering pump electrical heated, manual operators 230V, 40 w. Analog and Digital Multimeter (41/2 digit), LCR Meter. 30 MHz Dual Trace CRO. Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s LCD/LED trainer kit (21-inch full HD LCD/LED Color Television should support PAL/ NTSC video formats Complete block diagram of a LCD/LED TV system, Study board indicating various sections of TV along with the test points and switch faults.	

Module 7: Install a DTH system by proper selection of site, assembling of different parts/ accessories and troubleshoot the system.

Mapped to ELE/1009/OC7

Terminal Outcomes:

- Plan & setup the workplace different tools and equipment used in DTH installation procedure & cabling procedure and take due care using the tools.
- Monitor form of a surface areas a DTH system, select the site accordance with technical requirements.
- Set up the connection to STB by selecting the suitable port and cable.
- Identify the faults in DTH system & rectify.

Duration: *10:00*	Duration: *20:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
The students will describe the methods of the followings: ● Basic components of DTH system viz. Broadcasting Centre, . ● Encryption Transmission,The Satellite Dish, Multiplexer, ● Modulator, Encoder, The Receiver, Broadcasting Technology. ● Satellite receiver terminal, dish installation aspects, settings of dish/ DTH receiver. Types of cables used in DTH system. Set top box features.	The students will be able to demonstrate the followings: ● Identification & use of DTH system assembly. ● Identification & use of different tools and equipments used in DTH installation procedure & cabling procedure. ● Identification of various types of connectors and cables. ● Install a DTH system & get a TV station.
Classroom Aids:	
Computer,Projection Equipment,Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Connecting screwdriver 100 mm, Neon tester , Screwdriver set(set of 7), Insulation combination pliers 150mm, Insulated side cutting pliers150 mm, Soldering iron 25 w,Tweezers 150 mm De- soldering pump electrical heated, manual operators 230V, 40 w. Analog and Digital Multimeter (41/2 digit), LCR Meter. 30 MHz Dual Trace CRO. Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s LCD/LED trainer kit (21-inch full HD LCD/LED Color Television should support PAL/ NTSC video formats Complete block diagram of a LCD/LED TV system, Study board indicating various sections of TV along with the test points and switch faults. DTH system with set top box , remote and cables.	

Module 8: Dismantle, identify the parts of microwave oven and washing machine for the testing and repair.

Mapped to ELE/1009/OC8

Terminal Outcomes:

- Identify the different parts of microwave oven.
- Identify, use the controls on touch keypad of Microwave oven
- Identify the faults,dismantle and rectify the faults.
- Identify the faults in the given washing machine.
- Dismantle and identify of various parts, sensors, wire, trace of various controls.
- Rectify the faults by repair/ replacement of parts.

Duration: *10:00*	**Duration: *20:00***
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Different types of viz. Solo microwave , convection microwave and grill microwave . Study the various functions of Oven. • Washing M/c: different types of machines Manual, Semi automatic, fully automatic. washing techniques, manual, semiautomatic and fully automatic machines, basic working principle of manual, semi- automatic and fully automatic machines, study the working of motors, different types of timers, power supply circuits.	• Identification & use of controls on touch keypad of Microwave oven. • Dismantle and identification of various parts, wiring, tracing of various controls of Microwave oven. • Identify the faults in the given Microwave oven & rectify. Dismantle and identification of various parts, sensors, wiring, tracing of various controls, Electronic circuits, in various types of washing M/C. • Identify the faults in the given washing M/C and rectify.
Classroom Aids:	
Computer,Projection Equipment,Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Connecting screwdriver 100 mm, Neon tester , Screwdriver set(set of 7), Insulation combination pliers 150mm, Insulated side cutting pliers150 mm, Soldering iron 25 w,Tweezers 150 mm De- soldering pump electrical heated, manual operators 230V, 40 w. Analog and Digital Multimeter (41/2 digit), LCR Meter. 30 MHz Dual Trace CRO. Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s Washing machine (Semi automatic, automatic), Microwave oven (20 ltr capacity)	

Module 9: Install a CCTV system and configure the system for surveillance function

Mapped to ELE/1009/0C9

Terminal Outcomes:

- Identify & use different tools and equipment used for installation of CCTV, handle the tools with due care and safety.
- Identify the different CCTV components, Trace or follow the CCTV setup for any domestic installation.
- Identify the strategic locations for the installation of cameras.
- Plan and setup the procedure for switching the cameras to have different views.
- Identify the connectors and sockets used on DVRs, connect CCTV Cameras to DVR.

Duration: *15:00*	**Duration: *45:00***
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Types of cameras viz. Dome CCTV Cameras, Bullet CCTV Cameras, • C-Mount CCTV Cameras, PTZ Pan Tilt & Zoom Cameras, • Day/Night CCTV Cameras, Infrared/night vision CCTV Cameras, • Network/IP CCTV Cameras and Wireless CCTV Cameras and their specifications. • CCTV setup and its components Working of Digital Video Recorders and types of DVRs.	• Identification of different CCTV components. • Draw, trace or follow the CCTV setup of any commercial installation. • Identify the strategic locations for the installation of cameras. • Operate and learn the procedure for switching cameras to have different views. Identification of connectors and sockets used on DVRs. • Connect CCTV Cameras to DVR, Record and Replay.
Classroom Aids:	
Computer,Projection Equipment,Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Connecting screwdriver 100 mm, Neon tester , Screwdriver set(set of 7), Insulation combination pliers 150mm, Insulated side cutting pliers150 mm, Soldering iron 25 w,Tweezers 150 mm De- soldering pump electrical heated, manual operators 230V, 40 w. Analog and Digital Multimeter (41/2 digit), LCR Meter. 30 MHz Dual Trace CRO. Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s Soldering/de-soldering station. CCTV Set up DVR with amplifier	

Module 10: OJT

Mapped to ELE/1009/OC10

Terminal Outcomes:

Assessor will check report prepared for this component of training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 150 Hours.)

Duration:*00:00*	Duration: *60:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
	• Assessor will check report prepared for this component of training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 150 Hours.)
Classroom Aids:	
Tools, Equipment and Other Requirements	

Module11: Employability skills

Mapped to DGT/VSQ/N0102, v 1.0

Employability skills

Terminal Outcomes:

1. Demonstrate a comprehensive knowledge of constitutional values and apply them in their actions, decisions, and interactions, thereby upholding the principles of the constitution.
2. Develop proficiency in basic English skills, including reading, writing, listening, and speaking, enabling effective communication in everyday situations.
3. Exhibit proficiency in basic communication skills, including active listening, effective verbal and nonverbal communication, and clarity in expressing ideas, fostering successful interpersonal interactions.
4. Explain financial and legal literacy, including understanding key financial concepts, making informed financial decisions, and navigating legal frameworks related to personal and business finances.
5. Interpret digital tools and technologies, navigating online platforms, and practicing safe and responsible digital behavior.

- Discuss the importance of Employability Skills in meeting the job requirements. Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen. Discuss 21st century skills such as Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life.

- Use basic English for everyday conversation in different contexts, in person and over the telephone. Read and understand routine information, notes, instructions, mails, letters etc. written in English. Write short messages, notes, letters, e-mails etc. in English.
- Demonstrate how to communicate in a well -mannered way with others. Apply verbal and non-verbal communication etiquette and active listening techniques in various settings. Demonstrate working with others in a team
- Show how to conduct oneself appropriately with all genders and PwD.
- Select financial institutions, products and services as per requirement. Carry out offline and online financial transactions, safely and securely. identify common components of salary and compute income, expenses, taxes, investments etc.
- Show how to operate digital devices and use the associated applications and features, safely and securely. Use e-mail and social media platforms and virtual collaboration tools to work effectively. Use the features of word processor, spreadsheets and presentations. Create a biodata.
- Identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research. Identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity
- Identify different types of customers. Identify and respond to customer requests and needs in a professional manner

Classroom Aids:

Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook

Details Syllabus Content

Detail of Theory Syllabus: 90 hours

SL NO	CONTENT	DETAILS
1	Introduction to electricity	Basic terms such as electric charges, Potential difference, Voltage, Current, Resistance. Basics of AC & DC. Single phase and three phase supply. Terms like Line and Phase voltage/ currents. Insulators, conductors and semiconductor properties.
2	Electronics Measurement	Introduction to electrical and electronic measuring instruments. Basic principle and parts of simple meters. Importance and classification of meters. MC and MI meters. Range extension, need of calibration. Characteristics of meters and errors in meters. Multi meter, use of meters in different circuits. Care and maintenance of meters. Use of CRO.
3	Cells & Batteries	Cells & Batteries Construction, types of primary and secondary cells. Materials used, specification of cells and batteries. Charging process, efficiency, life of cell/battery.
4	Soldering and de-soldering	Soldering process. Solder materials and their grading. Use of flux and other materials. Soldering and de-soldering stations and their specifications.
5	Active and passive components	Active and passive components. Resistors; types of resistors, their construction & specific use, color-coding, power rating. Equivalent resistance of series parallel circuits.
6	Semiconductor	Semiconductor materials, components, number coding for different electronic components such as Diodes and Zeners etc. PN Junction. Rectifier, half wave and full wave rectifiers and its applications. Application of Zener diode as voltage regulator. Introduction to Transformer types, specification, symbol, uses.
7	AM/FM trans-receiver	Introduction to AM, FM transistor. Its various components and working viz. RF amplifier, Mixer, IF amplifier, AF amplifier and speaker.
8	Computer	Introduction to computer, Components of desktop and laptop computer. Hardware and software, I/O devices, and their working. Different types of printers. Windows and operating systems. Procedure of installation of software in a computer.
9	LCD/LED TV	Difference between a conventional CTV with LCD & LED TVs. Principle of LCD and LED TV and function viz. screen, chassis, motherboard, power board, remote receiving board, keypad, horn, remote control, all connection lines. Working principle, operation of remote control. Different adjustments, general faults in remote control.
10	DTH system	Basic components of DTH system viz. Broadcasting Centre, . Encryption Transmission,The Satellite Dish, Multiplexer, Modulator, Encoder, The Receiver, Broadcasting Technology. Satellite receiver terminal, dish installation aspects, settings of dish/ DTH receiver. Types of cables used in DTH system. Set top box features.
11	Microwave and washing machine	Microwave oven: Different types of viz. Solo microwave , convection microwave and grill microwave . Study the various functions of Oven. Washing M/c: different types of machines Manual, Semi automatic, fully automatic. washing techniques, manual, semiautomatic and fully automatic machines, basic working principle of manual, semi- automatic

		and fully automatic machines, study the working of motors, different types of timers, power supply circuits.
12	CCTV camera	Types of cameras viz. Dome CCTV Cameras, Bullet CCTV Cameras, C-Mount CCTV Cameras, PTZ Pan Tilt & Zoom Cameras, Day/Night CCTV Cameras, Infrared/night vision CCTV Cameras, Network/IP CCTV Cameras and Wireless CCTV Cameras. and their specifications. CCTV setup and its components Working of Digital Video Recorders and types of DVRs.

Detail of Practical Syllabus: 180 Hours

SL NO	CONTENT	DETAILS
1	Introduction to electricity	Identify the different hand tools viz. Screw driver, pliers, hammer, utility knife, voltmeter, ammeter, ohm-meter, wire strippers, wire crimpers etc Selection of proper tools for operation and precautions in operation. Basics of AC and Electrical Cables. Identify the Phase, Neutral and Earth on power socket, use testers to monitor AC power. Measure the voltage between phase and ground and rectify earthing.
2	Electronics Measurement	Demonstrate various analog measuring instruments. Find the minimum and maximum measurable range of the meter. Carryout mechanical zero setting of a meter.AC & DC measurements . Use the multi-meter to measure the various functions (AC V, DC V, DC I, AC I, R). Identify the different types of meter for measuring AC & DC parameters . Identify the different controls on the CRO front panel and observe the function of each control. Measure DC voltage, AC voltage, time period using CRO sine wave parameters.
3	Cells & Batteries	Cells & Batteries . Identify the +ve and -ve terminals of the battery. Identify the rated output voltage and Ah capacity of given battery. Measure the voltages of the given cells/battery using analog/ digital multimeter. Measure the specific gravity of the electrolyte using hydrometer. Test a battery and verify whether the battery is ready for use of needs recharging
4	Soldering and de-soldering	Soldering/ De-soldering procedure. Practice soldering on different electronic components, small transformer and lugs. Practice soldering on IC bases and PCBs. Practice de-soldering using pump for de-soldering.
5	Active and passive components	Identify Active and Passive Components. Identify the different types of active electronic components. Measure the resistor value by colour code and verify the same by measuring with multimeter. Identify resistors by their appearance and check physical defects.
6	Semiconductor	Power Supply Circuits. Identify different types of diodes, diode modules and their specifications. Test the given diode using multi-meter.

7	AM/FM trans-receiver	AM and FM Radio Wave Propagation – principle, fading. Construct and test AM transmitter and receivers. Dismantle the given FM receiver set and identify different stages. Identify the components microphone, audio pre-amplifier, modulator, oscillator, RF- amplifier, and antenna.
8	Computer	Demonstrate various parts of the computer system and motherboard components. Identify various computer peripherals and connect it to the system. Boot the system from different options. Install OS in a desktop computer. Install a Printer driver software and test for print outs. Install antivirus software, scan the system and explore the options in the antivirus software.
9	LCD/LED TV	LCD and LED TV . Identify and operate different Controls on LCD, LED TV . Identify components and different sections of LCD and LED TV. Dismantle identify the parts of the remote control Dismantle the given LCD/LED TV to find faults with input stages through connectors.Detect the defect in a LED/LCD TV receiver given to you. Rectify the fault. Troubleshoot the faults in the given LED/LCD TV receiver. Locate and rectify the faults. Test LED/LCD TV after troubleshooting the defects.
10	DTH system	DTH System Identification & use of DTH system assembly. Identification & use of different tools and equipments used in DTH installation procedure & cabling procedure. Identification of various types of connectors and cables. Install a DTH system & get a TV station.
11	Microwave and washing machine	Identification & use of controls on touch keypad of Microwave oven. Dismantle and identification of various parts, wiring, tracing of various controls of Microwave oven. Identify the faults in the given Microwave oven & rectify. Dismantle and identification of various parts, sensors, wiring, tracing of various controls, Electronic circuits, in various types of washing M/C. Identify the faults in the given washing M/C and rectify.
12	CCTV camera	Identification of different CCTV components. Draw, trace or follow the CCTV setup of any commercial installation. Identify the strategic locations for the installation of camDTHeras. Operate and learn the procedure for switching cameras to have different views. Identification of connectors and sockets used on DVRs. Connect CCTV Cameras to DVR, Record and Replay.

Syllabus of Employability Skill: 60 Hours

Introduction to Employability Skills Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that arerequired to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptivethinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person andover the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration:5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely andsecurely
23. Discuss the significance of displaying responsible online behavior while browsing, using various socialmedia platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises

27. Discuss how to identify opportunities for potential business, sources of funding and associated financialand legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies,and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

List of the Tools and Equipment
(For a batch of 30 students)

Sl no	Name and description	Quantity
1	Connecting screwdriver 100 mm	13 nos
2	Neon tester	13 nos
3	Screwdriver set(set of 7)	13 nos
4	Insulation combination pliers 150mm	13 nos
5	Insulated side cutting pliers150 mm	13 nos
6	Soldering iron 25 w	6 nos
7	Tweezers 150 mm	13 nos
8	De- soldering pump electrical heated, manual operators 230V, 40 w	6 nos
9	Analog and Digital Multimeter (41/2 digit)	4 nos each
10	LCR Meter.	2 nos
11	30 MHz Dual Trace CRO.	4 nos
12	Digital Storage Oscilloscope upto 200 MHz bandwidth and sampling rate upto 1 GS/s	1 no
13	Battery Charger 0 - 6 - 9 - 12 - 24, 15 Amps	1 no
14.	Soldering/de-soldering station	1 no
15.	AM and FM radio trainer kit	2 no each

16.	LCD/LED trainer kit (21-inch full HD LCD/LED Color Television should support PAL/ NTSC video formats Complete block diagram of a LCD/LED TV system, Study board indicating various sections of TV along with the test points and switch faults	1 no
17.	Washing machine (Semi-automatic, automatic)	1 no each
18.	Microwave oven (20 ltr capacity)	1 no
19.	Desktop computer latest configuration	2 nos
20.	Computer Mother Board trainer kit.	2 nos
21.	Laser jet printer	1 no
22.	Different Electronic components - Resistor, Capacitor, Inductor, Transformer (CT & Bridge type), Diode, Transistor (NPN & PNP), MOSFET, FET, UJT, Analog ICs (741,555, 78XX series, etc.), Digital ICs (7404, 7402, 7486,7400, 7432, 4001,4011, 4070,4071 etc).	As required
23.	CCTV Set up DVR with amplifier	2 system
24	Battery charger	2 nos
25	UPS	As required
26	Cells (Lithium) AA, AAA	As required
27	Lead acid battery 12 V	2 nos
28	DTH system, set top box, remote and cable required.	1 no each

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
CTS/ATS	Electronics mechanic/Mechanic consumer electronics trade	5	-	-	-	-
Diploma	Electronics/Computers/ Electrical/Electrical and Electronics	3	-	-	-	-
B. Tech/BE	Electronics/ Computer Science / IT/ Electrical/Electrical and Electronics	2	-	-	-	-
ITI	Instrument Mechanic Trade / Electronics Mechanic Trade	3	-	-	-	-

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Servicing of Domestic Electronics Products" mapped to QP: "STC-ELE/NSQF - 2018 /801 OR STC- ELE/2022 /1009".Minimum accepted score is 80%.	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack:"MEP/Q2601".Minimum accepted score as per MEPSC guidelines is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
CTS/ATS	Electronics mechanic/Mechanic consumer electronics trade	5	-	-	-	-
Diploma	Electronics/ Computers / Electrical/ Electrical and Electronics	3	-	-	-	-
B. Tech/BE	Electronics/ Computer Science / IT/ Electrical/Electrical and Electronics	2	-	-	-	-
ITI	Instrument Mechanic Trade / Electronics Mechanic Trade	3	-	-	-	-

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Servicing of Domestic Electronics Products" mapped to QP: "STC-ELE/NSQF - 2018 /801 OR STC- ELE/2022 /1009".Minimum accepted score is 80%.	Recommended that the Assessor is certified for the Job Role: "Assessor", mapped to the Qualification Pack: "MEP/Q2701". Minimum accepted score as per MEPSC guide lines is 80%.

Assessment Strategy

Assessment will be based on the concept of Independent Assessors empaneled with West Bengal State Council of Technical & Vocational Education & Skill Development (WBSCT&VE&SD), identified, selected, trained and certified on Assessment techniques. These Assessors would be aligned to assess as per the laid down criteria.

WBSCT&VE&SD would conduct assessment only at the training centers or designated testing centers authorized by WBSCT&VE&SD.

Ideally, the assessment will be a continuous process comprising of two distinct steps:

A. Continuous assessment by Trainers
B. Term end /Final Assessment by WBSCT&VE&SD

Each National Occupational Standard (NOS) in the respective QPs will be assigned weightage. Each Performance Criteria in the NOS will be assigned marks for theory and/or practical based on relative importance and criticality of function.

This will facilitate preparation of question bank / paper sets for each of the QPs. Each of these papers sets/question banks created by subject matter experts through WBSCT&VE&SD, especially with regard to the practical test and the defined tolerances, finish, accuracy etc.

The following tools are proposed to be used for final assessment:

i. Written Test: This will comprise of (i) True/False Statements and/or (ii)Multiple Choice Questions and/or (iii) Matching Type Questions. Online system for this will be preferred.
ii. Practical Test: This will comprise a test job to be prepared as per project briefing following appropriate working steps, using necessary tools, equipment and instruments. Through observation it will be possible to ascertain candidate's aptitude, attention to details, quality consciousness etc.
iii. Structured Viva-voce: This tool will be used to assess the conceptual understanding and the behavioral aspects as regards the job role and the specific task at hand.

Marks distribution as per outcome

Course Name	Sr No	Outcome No.	Outcome Name	Th Hrs	Pr Hrs	Total marks Th	Total marks Pr
Servicing of Domestic Electronics Products	1	ELE /1009/OC1	Apply Safe Working Practices	10	20	10	70
	2	ELE /1009/OC2	Select and perform electrical/ electronic measurement of single range meters and record the data.	10	20	10	70
	3	ELE /1009/OC3	Test & service different batteries used in electronic applications and record the data to estimate repair cost.	10	20	10	70
	4	ELE /1009/OC4	Plan and execute soldering & de-soldering of various electrical components used in domestic appliances and assemble and test a AM/FM receiver and evaluate performance.	10	20	20	80
	5	ELE /1009/OC5	Install, configure, interconnect given computer system(s) and demonstrate its I/O devices.	10	20	20	70
	6	ELE /1009/OC6	Identify, operate various controls, troubleshoot and replace modules of the LCD/LED TV and its remote.	10	20	20	70
	7	ELE /1009/OC7	Install a DTH system by proper selection of site, assembling of different parts/ accessories and troubleshoot the system.	10	20	20	70
	8	ELE /1009/OC8	Dismantle, identify the parts of microwave oven and washing machine for the testing and repair.	10	20	20	70
	9	ELE /1009/OC9	Install a CCTV system and configure the system for surveillance function	10	20	20	80
	10	ELE /1009/OC10	OJT	0	60	0	150
	11	DGT/VSQ/N0102	Employability Skill-60 Hrs	60		50	
	TOTAL Theory 90 Hrs, Practical 180 Hrs, Employability Skill 60 Hrs, OJT 60					200	800

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to Be known and/or understood in order to accomplish or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training Outcome is specified in terms of knowledge, understanding(theory)and skills (practical application).
OJT(M)	On-the-job training(Mandatory);trainees are mandated to complete specified hours of training on site
OJT(R)	On-the-job training(Recommended);trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psycho motor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards